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Research Interests

Mechanisms of glomerulosclerosis and atherosclerotic cardiovascular disease in patients with chronic renal failure can be attributed in part to dysregulation of cellular proliferation, extracellular matrix production, and cellular migration. Efforts under way in our laboratory focus on understanding how hormonal and growth factor signaling are involved with the progression of chronic renal failure and associated cardiovascular disease. With our collaborators, the laboratory investigates signal transduction cascades initiated by cell surface and plasma membrane receptors in renal and vascular cells to elucidate how the signals for abnormal growth are elicited and subsequently transmitted to downstream effectors. Signaling pathways are mapped by using serotonin, bradykinin, angiotensin II, and aldosterone receptors as ligands for their respective receptors. Some of the state-of-the-art methodologies currently used in the laboratory to support our investigations include the production and maintenance of renal cell culture(s); cell transfection techniques; western blotting; fluorescence and bioluminescent resonance energy transfer studies, to study protein-protein interactions; and assays for evaluating cellular proliferation, cell migration, extracellular matrix production, oxidant production, and transcriptional regulation. Our studies are designed to define new pathways that can be targeted therapeutically to slow the progression of chronic renal failure and its associated cardiovascular comorbidities.

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